

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-16) (Cancelled)

17) (New) A method of increasing the width of a redundant multi-stage network comprising a plurality of rows, having a first row and a last row, each row comprises a plurality of routers, each router comprises a plurality of ports, said plurality of ports comprises top ports and bottom ports, each port comprises a label, wherein the top ports of the first row and the bottom ports of the last row are connected to external sources, comprising the steps of:

providing a topology where the topology specifies for each port of each router of each row a corresponding port of a corresponding router to be connected, if said corresponding port exists;

inserting into each row a new router into a selected position within the row, wherein the new router comprises a plurality of top ports and bottom ports;

a) either rewiring a selected port to be connected to the corresponding port of the corresponding router for said selected port or permuting the labels of two or more ports of a selected router to reduce the number of ports which have to be rewired, wherein the selected port is any port having a corresponding port of a corresponding router and is not connected to said corresponding port;

repeating step a) until all the ports that have a corresponding port of the corresponding router are connected to said corresponding port;

connecting the top ports of the new router in the first row to external sources;

connecting the bottom ports of the new router in last row to external sources;

activating the top ports of the new router in the first row; and

activating the bottom ports of the new router in the last row.

18) (New) The method of Claim 17, wherein the step a) is rewiring a selected port to be connected the corresponding port of the corresponding router for the selected port, wherein the selected port is any port having a corresponding port of a corresponding router and is not connected to said corresponding port;

19) (New) The method of claim 17, wherein the rewiring a selected port comprises the steps of:

disconnecting any connection connected to the selected port;

disconnecting any connection connected to the corresponding port of the corresponding router for the selected port; and

connecting a connection between the selected port and the corresponding port;

20) (New) The method of claim 17, wherein the rewiring a selected port comprises the steps of:

deactivating the selected port;

disconnecting any connection connected to the selected port;

deactivating the corresponding port of the corresponding router for the selected port;

disconnecting any connection connected to the corresponding;

connecting a connection between the selected port and the corresponding port;

activating the selected port; and

activating the corresponding port.

21) (New) The method of claim 17, wherein the selection position within each row of the plurality of rows is the same thereby forming a column of new routers within the redundant multi-stage network.

22) (New) A method of increasing the width of a redundant multi-stage network comprising a plurality of rows, having a first row and a last row, each row comprises a plurality of routers, each router comprises a plurality of ports, said plurality of ports comprises top ports and bottom ports, each port comprises a label, wherein the top ports of the first row and the bottom ports of the last row are connected to external sources, comprising the steps of:

providing a topology where the topology specifies for each port of each router of each row a corresponding port of a corresponding router to be connected, if said corresponding port exists;

inserting into each row a new router into a selected position with the row, wherein the new router comprises a plurality of top ports and bottom ports;

a) selecting a selected row from all previously unselected rows from a row collection wherein the row collection comprises all rows except the last row from the plurality of rows, wherein the selected row is connected to an adjacent row below the selected row by an interconnection network where bottom ports of routers in the selected row are connected to top ports of routers in the adjacent row;

b) performing an iteration comprising the steps of:

c) selecting a selected port from a port pool comprising all bottom ports of all routers in the selected row and all top ports of all routers of the adjacent row that have a corresponding port and are not connected to said corresponding port;

d) rewiring the selected port to be connected the corresponding port of the corresponding router for said selected port; and

repeating the steps c) and d) until all bottom ports of routers in the selected row and all top ports of routers in the adjacent row that have a corresponding port of a corresponding router are connected to said corresponding port;

repeating steps a) and b) until all rows in the row collection have been selected;

connecting the top ports of the new router in the first row to external sources;

connecting the bottom ports of the new router in last row to external sources;

activating the top ports of the new router in the first row; and

activating the bottom ports of the new router in the last row.

- 23) (New) The method of claim 22, wherein step d) comprises the steps of:
- disconnecting any connection connected to the selected port;
  - disconnecting any connection connected to the corresponding port of the corresponding router for the selected port and;
  - connecting a connection between the selected port and the corresponding port.
- 24) (New) The method of claim 22, wherein step d) comprises the steps of:
- deactivating the selected port;
  - disconnecting any connection connected to the selected port;
  - deactivating the corresponding port of the corresponding router for the selected port;
  - disconnecting any connection connected to the corresponding port;
  - connecting a connection between the selected port and the corresponding port;
  - activating the selected port; and
  - activating the corresponding port.
- 25) (New) The method of claim 22 wherein step a) comprises the step of:
- picking as the selected row, a row within the row collection which is closest to the middle of the redundant multi-stage network and previously unselected.
- 26) (New) The method of claim 22 wherein the iteration further comprises the steps of:
- e) selecting a selected router in the selected row having a first bottom port and a second bottom port in the plurality of bottom ports, wherein the first bottom port is connected to any port of the corresponding router for the second bottom port;
  - f) exchanging the label of the first bottom port and label of the second bottom port; and repeating steps e) and f) until there are no routers having a first bottom port and a second bottom port, wherein the first bottom port is connected to any port of the corresponding router for the second bottom port.

- 27) (New) The method of claim 26, wherein the iteration further comprises the steps of:
- g) selecting a selected router in the adjacent row having a first top port and a second top port in the plurality of top ports, wherein the first top port is connected to the corresponding port of the corresponding router for the second top port;
  - h) exchanging the label of the first bottom port and label of the second bottom port; and repeating steps g) and h) until there are no routers having a first bottom port and a second bottom port, wherein the first bottom port is connected to the corresponding port of the corresponding router for the second bottom port.
- 28) (New) The method of claim 22 wherein step c) comprises the step of:  
if a disconnected port exists in the port pool, selecting said disconnected port as the selected port.
- 29) (New) The method of claim 22 wherein step c) comprises the step of:  
if a disconnected port exists in the port pool, wherein the corresponding port of the corresponding router for the disconnected port is not connected, selecting said disconnected port as the selected port.
- 30) (New) The method of claim 22 wherein step c) comprises the step of:  
if a disconnected port exists in the port pool, wherein all ports of a router connected to the corresponding port of the corresponding router for the disconnected port are connected, selecting said disconnected port as the selected port.

31) (New) The method of claim 22 wherein step c) comprises the steps of:

- e) if a first disconnected port exists in the port pool, selecting said first disconnected port as the selected port, wherein the corresponding port of the corresponding router for the first disconnected port is not connected;
- f) if no port was selected as the selected port in step e) and a second disconnected port exists in the port pool, selecting said second disconnected port as the selected port, wherein all ports of a router connected to the corresponding port of the corresponding router for the second disconnected port are connected;
- g) if no port was selected as the selected port in step e) or f) and if a third disconnected port exists in the port pool, selecting said third disconnected port as the selected port, wherein the third disconnected port is not connected; and
  - if no port was selected as the selected port in step e), f) or g), selecting any port in the port pool as the selected port.

32) (New) The method of claim 22 wherein step c) comprises the steps of:

if a previously disconnected port exists in the port pool, selecting said previously disconnected port as the selected port, otherwise picking any port in the port pool as the selected port, wherein the previously disconnected port was disconnected in a previous iteration of step c).

33) (New) The method of claim 22 further comprising the steps of:

- providing a port fifo,
- and wherein step c) comprises the steps of:
  - e) if the port fifo is empty, adding to the port fifo all ports in the port pool which are not connected;
  - f) if no ports are added to the port fifo in step e), selecting as the selected port any port in the port pool;
    - if no port was selected as the selected port in step f), selecting as the selected port, a next port in the port fifo;

34) (New) A method of decreasing the width of a redundant multi-stage network comprising a plurality of rows, having a first row and a last row, each row comprises a plurality of routers, each router comprises a plurality of ports, said plurality of ports comprises top ports and bottom ports, each port comprises a label, wherein the top ports of the first row and the bottom ports of the last row are connected to external sources, comprising the steps of:

providing a topology where the topology specifies for each port of each router of each row a corresponding port of a corresponding router to be connected, if said corresponding port exists;

selecting a selected router in each row to be removed;  
deactivating the top ports of the selected router in the first row;  
deactivating the bottom ports of the selected router in the last row;  
disconnecting the top ports of the selected router in the first row from external sources;

disconnecting the bottom ports of the selected router in last row from external sources;

a) either rewiring a selected port to be connected to the corresponding port of the corresponding router for said selected port or permuting the labels of two or more ports of a selected router to reduce the number of ports which have to be rewired, wherein the selected port is any port having a corresponding port of a corresponding router and is not connected to said corresponding port;

repeating step a) until all the ports that have a corresponding port of the corresponding router are connected to said corresponding port; and

removing the selected routers from each row.

35) (New) The method of Claim 34, wherein the step a) is rewiring a selected port to be connected the corresponding port of the corresponding router for the selected port, wherein the selected port is any port having a corresponding port of a corresponding router, said selected port and is not connected to said corresponding port;

36) (New) A method of decreasing the width of a redundant multi-stage network comprising a plurality of rows, having a first row and a last row, each row comprises a plurality of routers, each router comprises a plurality of ports, said plurality of ports comprises top ports and bottom ports, each port comprises a label, wherein the top ports of the first row and the bottom ports of the last row are connected to external sources, comprising the steps of:

providing a topology where the topology specifies for each port of each router of each row a corresponding port of a corresponding router to be connected, if said corresponding port exists;

selecting a selected router in each row to be removed;  
deactivating the top ports of the selected router in the first row;  
deactivating the bottom ports of the selected router in the last row;  
disconnecting the top ports of the selected router in the first row from external sources;

disconnecting the bottom ports of the selected router in last row from external sources;

a) selecting a selected row from all previously unselected row from a row collection wherein the row collection comprises all rows except the last row from the plurality of rows, wherein the selected row is connected to an adjacent row below the selected row by an interconnection network where bottom ports of routers in the selected row are connected to top ports of routers in the adjacent row;

b) performing an iteration comprising the steps of:

c) selecting a selected port from a port pool comprising all bottom ports of all routers in the selected row and all top ports of all routers of the adjacent row that have a corresponding port of a corresponding port and are not connected to said corresponding port;

d) rewiring the selected port to be connected the corresponding port of the corresponding router for said selected port; and

repeating the steps c) and d) until all bottom ports of routers in the selected row and all top ports of routers in the adjacent row that have a corresponding port of a corresponding router are connected to the corresponding port;

repeating steps a)-b) until all rows in the for row collection have been selected; and removing the selected routers from each row.

- 37) (New) The method of claim 36, wherein the iteration further comprises the steps of:
- e) selecting a selected router in the selected row having a first bottom port and a second bottom port in the plurality of bottom ports, wherein the first bottom port is connected to any port of the corresponding router for the second bottom port;
  - f) exchanging the label of the first bottom port and label of the second bottom port;  
repeating steps e) and f) until there are no routers having a first bottom port and a second bottom port, wherein the first bottom port is connected to any port of the corresponding router for the second bottom port;
  - g) selecting a selected router in the adjacent row having a first top port and a second top port in the plurality of top ports, wherein the first top port is connected to the corresponding port of the corresponding router for the second top port;
  - h) exchanging the label of the first bottom port and label of the second bottom port; and  
repeating steps g) and h) until there are no routers having a first bottom port and a second bottom port, wherein the first bottom port is connected to the corresponding port of the corresponding router for the second bottom port.